

**Invoice****Moffatt & Nichol****3780 Kilroy Airport Way, Suite 750****Long Beach, CA 90806****Phone: 562-590-6500**

March 27, 2015

Project No: 6664-02

Invoice No: 000000709674

Robert Law

K&amp;L Representing the Cooperating Parties Group

186 Center Street, Suite 290

Clinton, NJ 08809

Project 6664-02 Lower Passaic River/Newark Bay Modeling

**Professional Services from February 01, 2015 to February 28, 2015****LPR/NB Modeling Program****TOM8**

Task 01 Coordination and Meetings

**Professional Personnel**

	Hours	Rate	Amount
Senior Engineer/Scientist			
Canizares, Rafael	15.00	195.00	2,925.00
Engineer/Scientist II			
Mathew, Rooni	2.00	172.00	344.00
Totals	17.00		3,269.00
<b>Total Labor</b>			<b>3,269.00</b>
<b>Total this Task</b>			<b>\$3,269.00</b>

Task 02 Data Analysis and Monitoring

**Professional Personnel**

	Hours	Rate	Amount
Staff Engineer/Scientist			
Manian, Dinesh	8.00	119.00	952.00
Totals	8.00		952.00
<b>Total Labor</b>			<b>952.00</b>
<b>Total this Task</b>			<b>\$952.00</b>

Task 04 LPR/NB Hydrodynamic Model

**Professional Personnel**

	Hours	Rate	Amount
Senior Engineer/Scientist			
Canizares, Rafael	2/2/2015 22.00	195.00	4,290.00
Staff Engineer/Scientist			
Manian, Dinesh	2/19/2015 9.00	119.00	1,071.00
Totals	31.00		5,361.00
<b>Total Labor</b>			<b>5,361.00</b>
<b>Total this Task</b>			<b>\$5,361.00</b>

Task 05 LPR/NB Sediment Transport Model

**Professional Personnel**

	Hours	Rate	Amount
Engineer/Scientist II			
Mathew, Rooni	2/1/2015 60.00	172.00	10,320.00
Totals	60.00		10,320.00

<b>Total Labor</b>						<b>10,320.00</b>
				<b>Total this Task</b>		<b>\$10,320.00</b>

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Task	07	LPR/NB Contaminant Fate & Transport Mdel
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**Professional Personnel**

			<b>Hours</b>	<b>Rate</b>	<b>Amount</b>	
Engineer/Scientist II						
Mathew, Rooni	2/1/2015		53.00	172.00	9,116.00	
Totals			53.00		9,116.00	
<b>Total Labor</b>						<b>9,116.00</b>

<b>Total this Task</b>	<b>\$9,116.00</b>
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<b>Total this Phase</b>	<b>\$29,018.00</b>
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<b>Total this Invoice</b>	<b>\$29,018.00</b>
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<b>ACH Payment Remittance Information</b> Bank Account Name: Moffatt & Nichol Bank Number: 4159349729 Routing: 121000248
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Project 6664-02 Lower Passaic River/Newark Bay Modeling

**Professional Services from February 01, 2015 to February 28, 2015****LPR/NB Modeling Program TOM8**

Task 01 Coordination and Meetings

**Professional Personnel**

		Hours	Rate	Amount
Senior Engineer/Scientist				
Canizares, Rafael	2/4/2015	3.00	195.00	585.00
Canizares, Rafael	2/9/2015	1.00	195.00	195.00
Canizares, Rafael	2/10/2015	2.00	195.00	390.00
Canizares, Rafael	2/11/2015	3.00	195.00	585.00
Canizares, Rafael	2/16/2015	1.00	195.00	195.00
Canizares, Rafael	2/17/2015	1.00	195.00	195.00
Canizares, Rafael	2/20/2015	4.00	195.00	780.00
Engineer/Scientist II				
Mathew, Rooni	2/4/2015	2.00	172.00	344.00
Totals		17.00		3,269.00
<b>Total Labor</b>				<b>3,269.00</b>
			<b>Total this Task</b>	<b>\$3,269.00</b>

Task 02 Data Analysis and Monitoring

**Professional Personnel**

		Hours	Rate	Amount
Staff Engineer/Scientist				
Manian, Dinesh	2/3/2015	5.00	119.00	595.00
Manian, Dinesh	2/13/2015	3.00	119.00	357.00
Totals		8.00		952.00
<b>Total Labor</b>				<b>952.00</b>
			<b>Total this Task</b>	<b>\$952.00</b>

Task 04 LPR/NB Hydrodynamic Model

**Professional Personnel**

		Hours	Rate	Amount
Senior Engineer/Scientist				
Canizares, Rafael	2/2/2015	1.00	195.00	195.00
Canizares, Rafael	2/3/2015	1.00	195.00	195.00
Canizares, Rafael	2/13/2015	2.00	195.00	390.00
Canizares, Rafael	2/17/2015	2.00	195.00	390.00
Canizares, Rafael	2/19/2015	2.00	195.00	390.00
Canizares, Rafael	2/23/2015	2.00	195.00	390.00
Canizares, Rafael	2/24/2015	2.00	195.00	390.00

Canizares, Rafael	2/25/2015	4.00	195.00	780.00	
Canizares, Rafael	2/26/2015	4.00	195.00	780.00	
Canizares, Rafael	2/27/2015	2.00	195.00	390.00	
Staff Engineer/Scientist					
Manian, Dinesh	2/19/2015	1.00	119.00	119.00	
Manian, Dinesh	2/20/2015	3.00	119.00	357.00	
Manian, Dinesh	2/24/2015	5.00	119.00	595.00	
Totals		31.00		5,361.00	
<b>Total Labor</b>					<b>5,361.00</b>
<b>Total this Task</b>					<b>\$5,361.00</b>

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Task 05 LPR/NB Sediment Transport Model

**Professional Personnel**

		<b>Hours</b>	<b>Rate</b>	<b>Amount</b>	
Engineer/Scientist II					
Mathew, Rooni	2/1/2015	1.00	172.00	172.00	
Mathew, Rooni	2/2/2015	.50	172.00	86.00	
Mathew, Rooni	2/3/2015	1.50	172.00	258.00	
Mathew, Rooni	2/5/2015	4.50	172.00	774.00	
Mathew, Rooni	2/6/2015	7.00	172.00	1,204.00	
Mathew, Rooni	2/9/2015	3.00	172.00	516.00	
Mathew, Rooni	2/10/2015	3.00	172.00	516.00	
Mathew, Rooni	2/13/2015	1.50	172.00	258.00	
Mathew, Rooni	2/16/2015	3.50	172.00	602.00	
Mathew, Rooni	2/17/2015	1.50	172.00	258.00	
Mathew, Rooni	2/18/2015	5.00	172.00	860.00	
Mathew, Rooni	2/19/2015	2.00	172.00	344.00	
Mathew, Rooni	2/20/2015	6.00	172.00	1,032.00	
Mathew, Rooni	2/23/2015	6.50	172.00	1,118.00	
Mathew, Rooni	2/24/2015	1.00	172.00	172.00	
Mathew, Rooni	2/25/2015	3.00	172.00	516.00	
Mathew, Rooni	2/26/2015	6.50	172.00	1,118.00	
Mathew, Rooni	2/27/2015	3.00	172.00	516.00	
Totals		60.00		10,320.00	
<b>Total Labor</b>					<b>10,320.00</b>
<b>Total this Task</b>					<b>\$10,320.00</b>

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Task 07 LPR/NB Contaminant Fate & Transport Mdel

**Professional Personnel**

		<b>Hours</b>	<b>Rate</b>	<b>Amount</b>	
Engineer/Scientist II					
Mathew, Rooni	2/1/2015	2.50	172.00	430.00	
Mathew, Rooni	2/2/2015	4.00	172.00	688.00	
Mathew, Rooni	2/3/2015	6.00	172.00	1,032.00	
Mathew, Rooni	2/4/2015	3.00	172.00	516.00	
Mathew, Rooni	2/5/2015	1.00	172.00	172.00	
Mathew, Rooni	2/6/2015	1.00	172.00	172.00	
Mathew, Rooni	2/9/2015	5.00	172.00	860.00	
Mathew, Rooni	2/10/2015	3.50	172.00	602.00	
Mathew, Rooni	2/11/2015	2.50	172.00	430.00	
Mathew, Rooni	2/12/2015	1.00	172.00	172.00	
Mathew, Rooni	2/13/2015	1.00	172.00	172.00	
Mathew, Rooni	2/16/2015	4.50	172.00	774.00	
Mathew, Rooni	2/17/2015	2.50	172.00	430.00	
Mathew, Rooni	2/18/2015	.50	172.00	86.00	
Mathew, Rooni	2/19/2015	1.00	172.00	172.00	
Mathew, Rooni	2/20/2015	1.00	172.00	172.00	
Mathew, Rooni	2/23/2015	.50	172.00	86.00	
Mathew, Rooni	2/24/2015	5.00	172.00	860.00	
Mathew, Rooni	2/25/2015	5.00	172.00	860.00	

Mathew, Rooni	2/26/2015	1.50	172.00	258.00	
Mathew, Rooni	2/27/2015	1.00	172.00	172.00	
Totals		53.00		9,116.00	
<b>Total Labor</b>					<b>9,116.00</b>
			<b>Total this Task</b>		<b>\$9,116.00</b>
			<b>Total this Phase</b>		<b>\$29,018.00</b>
			<b>Total this Invoice</b>		<b>\$29,018.00</b>



529 5<sup>th</sup> Avenue  
14<sup>th</sup> floor  
New York, NY 10017

(212) 768-7454  
Fax (212) 768-7936

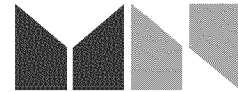
***Detailed Description of work done by M&N personnel associated to the LPR/NB Modeling Program Task Order Memoranda 8 - Scope of Work for the period 02/01/2014 to 02/28/2015 M&N Project No. 6664***

**Hydrodynamics Principal Investigator - Rafael Cañizares.**

<b>Task 1 – Project Management</b>	<ul style="list-style-type: none"><li>• Internal coordination with Deltares and M&amp;N</li><li>• Calls and Coordination with Project Coordinator</li><li>• Coordination with Project Coordinator and AQEA including calls for modeling update</li><li>• Coordination with Han Winterwerp</li><li>• RI report Call</li><li>• Prepare Invoice for December 2014</li><li>• Call-in TC meeting</li></ul>
<b>Task 4 – LPR/NB Hydrodynamic Modeling</b>	<ul style="list-style-type: none"><li>• Hydrodynamic model report</li><li>• Review developments of HD model report by Dinesh Manian</li><li>• HD report for RI section 7</li></ul>

**Rooni Mathew.**

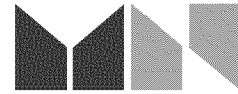
<b>Task 1 – Project Management</b>	<ul style="list-style-type: none"><li>• Call-in to TC meeting</li></ul>
<b>Task 5 – LPR/NB Sediment Transport Modeling</b>	<ul style="list-style-type: none"><li>• Debug/relaunch crashed FS runs</li><li>• Relaunch crashed LT infilling run</li><li>• Develop ST model report</li><li>• Review/debug Alt 3 ST sensitivity with bed resetting every 15 yrs,</li><li>• Develop. FS runs with bed resetting every 15 yrs</li><li>• Review/debug instabilities in Alt 2 run with bed resetting</li><li>• Conference call with AQEA on RI report, develop RI report</li><li>• Develop HDD backups, review FS runs progress with annual bathy change maps</li><li>• Discuss modeling tasks with Han Winterwerp, review FS runs progress, develop RI report section</li><li>• Debug ST 2cm bed composition output, respond to AQEA questions, develop RI report, review FS run progress</li><li>• Develop RI report write-up</li></ul>



	<ul style="list-style-type: none"> <li>• Transmit updated outputs to AQEA for 2cm issue</li> <li>• Develop ST/OC RI report write-up, review/restart crashed FS runs</li> </ul>
<b>Task 7 – LPR/NB Contaminate Fate and Transport Modeling</b>	<ul style="list-style-type: none"> <li>• Redo V6 AOC, launch V6 Alt 3 TCDD/4PCB run, launch AOC/CFT for Alt 3 sensitivity with bed resetting every 15 yrs</li> <li>• Debug/Respond to AQEA questions on Alt 2 crash, conf. call with AQEA, post-process outputs from Alt 3 sensitivity with bed resetting after 15 yrs</li> <li>• Respond to AQEA questions on FS runs, review/debug Alt3 CFT run with bed resetting</li> <li>• Respond to AQEA questions on FS runs, review Alt 3 CFT sensitivity with bed resetting every 15 yrs</li> <li>• Review Alt 3 CFT sensitivity with bed resetting every 15 yrs</li> <li>• Respond to AQEA questions on FS runs</li> <li>• Test run to debug Alt3 with bed resetting and discuss with AQEA, setup/launch revised FS</li> <li>• AOC/CFT runs with latest code/inputs from AQEA</li> <li>• Post-process outputs for AQEA, debug FS runs crash/revise code and restart FS runs</li> <li>• Process outputs for AQEA, relaunch CFT FS runs with revised code from AQEA</li> <li>• Process outputs for AQEA</li> <li>• Post-process outputs for AQEA, respond to AQEA questions, hard-disk crash on Carly; restart Alt 3 sensitivity without sand cap</li> <li>• Review FS runs progress</li> <li>• Launch 4 additional FS runs for AQEA</li> <li>• Process outputs for AQEA</li> <li>• Review FS runs progress</li> <li>• Respond to EPA questions on OC runs, respond to AQEA requests and questions, debug FS MNR CFT run crashes in 9899.</li> <li>• Restart bashful, restart Alt 3 sensitivity without sand cap CFT and HD runs, develop AOC remediation processors to hot-start Alt4, launch Alt4 AOC/CFT runs, launch Alt3 sensitivity with bed resetting every 15 yrs</li> <li>• Process FS runs outputs and transmit to AQEA</li> <li>• Respond to AQEA questions on CFT issues</li> </ul>

**Dinesh Manian**

<b>Task 2 – Data Analysis</b>	<ul style="list-style-type: none"> <li>• Computing prediction intervals on PWCM suspended sediment data</li> <li>• Prediction intervals for PWCM ADCP TSS data</li> </ul>
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<b>Task 4 – LPR/NB Hydrodynamic Modeling</b>	<ul style="list-style-type: none"><li>• HD model validation to Mar 16 and Spring 2010 salinity transects</li><li>• Processing HD model runs to compare with Spring and Fall PWCM data</li></ul>
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